



(1 of 2)

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet **1** of **3**

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

considered
on 9/24/2007

U.S. PATENT DOCUMENTS

Examiner	Cite No. ¹	Document Number		Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
		6,422,941		7/23/2002	Thomer et al.	
		6,160,489		12/12/2000	Perry et al.	
		6,111,677		8/29/2000	Zilles et al.	
		5,694,582		11/25/1997	Ulrich et al.	
		5,575,761		11/19/1996	Hajjanpour	
		5,437,607		8/1/1995	Taylor	
		5,436,622		7/25/1995	Gutman et al.	
		5,283,970		2/8/1994	Aligner	
		5,186,695		2/16/1993	Mangseth et al.	
		5,175,459		12/8/1992	Danial et al.	
		5,165,897		11/24/1992	Johnson	
		5,022,384		6/11/1991	Freels	
		4,885,565		12/5/1989	Embach	
		4,484,191		11/20/1984	Vavra	
		4,464,131		8/7/1984	Foerst	
		4,393,070		6/1/1982	Barnes	
		4,262,549		4/21/1981	Schwelienbach	
		4,127,752		11/28/1978	Lowthorp	
		2,972,140		2/14/1961	Hirsch	

Examiner Initials*	Cite No. ¹	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ³	Number ⁴	Kind Code ⁵ (if known)			
		JP	H2-185278		7/19/1990	Taito Corporation	
		JP	H4-8381		1/13/1992	Epoch Co. and Key- Planning Co.	
		JP	H7-24147		1/27/1995	Sega Corporation	
		JP	H5-192449		8/3/1993	Taito Corporation	

Examiner
Signature

/Jeffery Brier/

Date
Considered

08/03/2008

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **2** of **3****Complete if Known**

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," <i>Master of Science Thesis</i> , MIT, Aug. 1990, archived Nov. 8, 1990.
		CALDER, "Design of A Force-Feedback Touch-Introducing Actuator For Teleoperator Robot Control," <i>Bachelor of Science Thesis</i> , MIT, May 1983, archived June 23, 1983.
		WIKER, "Teletouch Display Development: Phase 1 Report," <i>Technical Report 1230</i> , Naval Ocean Systems Center, San Diego, July 1988.
		BLISS, "Optical-to-Tactile Image Conversion for the Blind," <i>IEEE Transactions on Man-Machine Systems</i> , Vol. MMS-11, No. 1, March 1970.
		JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," <i>Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-90-039</i> , August, 1990.
		KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," PRESENCE, 4(4):387-402, Harvard Univ., 1995.
		AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.
		EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, <i>Dynamic Systems and Control</i> Volume 1, ASME 1994.
		GOBEL et al., "Tactile Feedback Applied to Computer Mice," <i>International Journal of Human-Computer Interaction</i> , Vol. 7, No. 1, pp. 1-24, 1995.
		PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.
		"Cyberman Technical Specification," <i>Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide</i> , 4/5/1994.
		OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," <i>Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95</i> , Seoul, Korea, 21-24 August 1995.
		KACZMAREK et al., "Tactile Displays," <i>Virtual Environment Technologies</i> , Chap. 9, pp. 349-414.
		LAKE, "Cyberman from Logitech," at http://www.ibiblio.org/GameBytes/issue21/greviews/cyberman.html , 1994.

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **3** of **3****Complete if Known**

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part no. C-25502, Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).
		Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part no. C-25502, Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).
		SCANNELL, "Taking a Joystick Ride," <i>Computer Currents</i> , Boston Edition, Vol. 9, No. 11, November 1994
		YAMAKITA et al., "Tele-Virtual Reality of Dynamic Mechanical Models," Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems, Raleigh, NC, July 7-10, 1992
		NOLL, "Man-Machine Tactile," <i>SID Journal</i> , July/August 1972 Issue.
		ROSENBERG, "Virtual Fixtures: Perceptual Overlays Enhance Operator Performance In Telepresence Tasks," <i>Ph.D. Dissertation</i> , Stanford University, June 1994.

considered on
9/24/2007

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **5** of **8****Complete If Known**

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

Examiner Initials*	Cite No. ¹	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ²	Number ³	Kind Code ⁴ (if known)			
		EP	0085518	A1	08-1983		
		WO	96/16397		05-1996		
		WO	96/39944		12-1996		
		JP	4-34610		02-1992		
		GB	2254911		10-1992		
		WO	9502233		01-1995		
		WO	9502801		01-1995		
		WO	9520787		08-1995		
		WO	9520788		08-1995		
		WO	9532459		11-1995		
		WO	9616397		05-1996		
		WO	9622591		07-1996		
		WO	9642078		12-1996		
		WO	9712357		04-1997		

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **6** of **8****Complete if Known**

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		Curso Waldo, "Designer's Corner-Useful Technology for Your Idea File Design News," March 7, 1994, pp. 63.
		Akamatsu, et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presence, vol. 3, No. 1, Winter 1994, pp. 73-80.
		Kelley, et al., "On the Development of a Force-Feedback Mouse and Its Integration into a Graphical User Interface," Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems, Int'l Mech. Eng. Congress and Exhibition, Nov. 1994.
		Hayward, et al., "Design and Multi-Objective Optimization of a Linkage for a Haptic Interface," excerpt from Advances in Robot Kinematics and Computational Geometry, 1994 Kluwer Academic Publishers, pp. 359-368.
		Winey III, Calvin Mccoy, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control," MIT., Jun. 1981, pp. 1-79.
		Tan, Hong Z. et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," ASME 1993, Dec. vol. 49, pp. 99-104.
		Kotoku, Tetsuo, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," IEEE 1992, Jul. 7-10, 1992, pp. 239-246.
		Slocum, Alexander W., Precision Machine Design, Prentice Hall, 1992, pp. 664-664.
		"12-Volt Coil Motor Driver," SI9961 Jun. 6, 1994, pp. 4-10-4-16.
		Kotoku, Tetsuo et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE Nov. 3-5, 1991, pp. 99-1004.
		Bejczy, Antal K., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," IEEE 1990, pp. 546-550.
		Tan, Hong Z., et al., "Human Factors for the Design of Force-Reflecting Haptic Interfaces," Tan, Srinivasan, Eberhard, & Chang, ASME WAM 1994, pp. 1-11.
		Iwata, Hiroo et al, Volume Haptization, IEEE 1993, pp. 16-16.
		Fischer, Patrick et al., "Specification and Design of Input Devices for Teleoperation," 1990.
		Burdia, Grigore et al., "Distributed Virtual Force Feedback," IEEE, May 2, 1993, pp. 25-44.
		Rosenberg, Louis B., "The Use of Virtual Fixtures as Perceptual Overlays to Enhance Operator Performance in Remote Environments," Air Force Materiel Command, Sep. 1992 pp. 1-42.

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet **7** of **8****Complete if Known**

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. 1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		Rosenberg, Louis B. et al., "Perceptual Decomposition of Virtual Haptic Surfaces," IEEE, Oct. 1993.
		Rosenberg, Louis B., "Virtual Fixtures as Tools to Enhance Operator Performance in Telepresence Environments" SPIE Telemanipulator Technology, Mar. 1993.
		Rosenberg, Louis B., "Virtual Haptic Overlays Enhance Performance in Telepresence Tasks," SPIE 1994.
		Burdick, Grigore et al., "Dextrous Telerobotics with Force Feedback-An Overview," Robotica 1991, vol. 9.
		Yamakita, M. et al., Tele-Virtual Reality of Dynamic Mechanical Model, IEEE Jul. 7-10, 1992, pp. 1103-1110.
		Chen, Young-Ming et al., "Force Display Performs Better than Visual Display in a Simple 6-D Docking Task," IEEE 1989, pp. 1462-1466.
		Kim, Won S. et al., "Graphics Displays for Operator Aid in Telemanipulation," IEEE 1991, pp. 1059-1067.
		Hannaford, Blake et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE May/Jun. 1991, vol. 21, No. 3, pp. 620-633.
		Kim, Won S. et al., A Teleoperation Training Simulator with Visual and Kinesthetic Force Virtual Reality.
		Burdick, Grigore et al., "A Portable Dextrous Master with Force Feedback," Presence: Teleoperators and Virtual Environments, MIT Press, Jun. 1994.
		Fisher, S.S. et al., "A Virtual Environment Display System," ACM Interactive 3D Graphics, Oct. 1986.
		"The Personal Digitizer.TM.," Immersion Human Interface Corporation 1994, Catheter Device.
		"High Performance Model of the Immersion Probe," Immersion Probe-MD.TM., Immersion Human Interface Corporation.
		3D Human Interface Tool, Immersion Probe.TM., Immersion Human Interface Corporation 1994.
		Meyer, Kenneth et al., "A Survey of Position Trackers," The Massachusetts Institute of Technology 1982, Presence, vol. 1, No. 2.

Examiner
Signature

/Jeffery Brier/

Date

Considered

08/03/2008

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 8 of 8

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		*Useful Technology for Your Idea File," Design News, Mar. 7, 1994, pp. 63.
		Smith, Geoffrey, "Call It Palpable Progress," Business Week, Oct. 9, 1995, pp. 93, 96.
		Herndon, J.N. et al., "The State-of-the-Art Model M-2 Maintenance System," Proceedings of the 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, pp. 59-65.
		*Proceedings of the IEIP Congress 65," International Federation for Information Processing, Information Processing 1965, vol. 3, New York, May 24-25, 1966, pp. 506.
		Noll, A. Michael, "Man-Machine Tactile Communication Dissertation," Polytechnic Institute of Brooklyn, Jun. 1971, pp. 1-8.
		*DunYoung, Ming et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE 1988, pp. 1824-1829.
		Wiker, Steven F. et al., "Development of Tactile Mice for Blind Access to Computers: Importance of Stimulation Locus, Object Size, and Vibrotactile Display Resolution," Proceedings of the Human Factors Society 35th Annual Meeting 1991, pp. 708-712.
		*Kruenger, Myron W., "Artificial Reality 1988, pp. 54-75.
		"Foot-Operated Mouse," IBM Technical Disclosure Bulletin, Apr. 1986, vol. 28, No. 11.

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Please type a plus sign (+) inside this box → ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	
				Filing Date	February 19, 2004
				First Named Inventor	Louis B. ROSENBERG
				Group Art Unit	
				Examiner Name	
Sheet	5	of	8	Attorney Docket Number	IMMR-050/04US

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	T ⁴
		Office ¹	Number ²	Kind Code ³ (if known)			
repeat from		EP	0 349 086	A1	Stork Kwant B.V.	01/03/1990	
1 of 2	1 of 3	JP	H4-8381		Taito Corporation	01/13/1992	
		JP	H2-156276		Taito Corporation	07/19/1990	
		JP	H7-24147		Sega Corporation	01/27/1995	
repeat from		JP	H5-192449		Taito Corporation	08/03/1993	
2 of 2	5 of 3	JP	4-34610			02/05/1992	
		UK	2254911A			10/21/1992	
		PCT	WO9502733			01/19/1995	
		PCT	WO9520767			08/03/1995	
		PCT	WO9520788			08/03/1995	
		PCT	WO9532459			11/30/1995	

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁴
		Balgrie, "Electric Control Loading - A Low Cost, High Performance Alternative," <i>Proceedings of Interservice/Industry Training Systems Conference</i> , pp. 247-254, November 6-8, 1990	
		Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993	
		Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," <i>MIT Libraries Archives</i> pp. 1-131, May 1990, archived 8/14/90	
		Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," <i>JPL Publication 85-11</i> , NASA-CR-175890; N85-28559, pp. 1-84, 03/1/1985	
		Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); <i>Experimental Brain Research</i> , Vol. 79, No. 1, pp. 150-156, 1990	
repeat from		Burdies et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," <i>1999 IEEE International Conference on Robotics and Automation</i> , pp. 25-44, 05/02/1993	
7 of 8		Snow et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989	
		Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990	
		Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," <i>MIT Archive</i> , pp. 1-88, February 1990, archived 8/13/90	
		Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993	
		Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 1-12, 1992	

Examiner Signature	/Jeffery Briet/	Date Considered	08/03/2008
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

² For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

³ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁴ Applicant is to place a check mark here if English language Translation is under.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Please type a plus sign (+) inside this box → ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>			Complete if Known		
			Application Number		
			Filing Date February 19, 2004		
			First Named Inventor Louis B. ROSENBERG		
			Group Art Unit		
Examiner Name					
Sheet	6	of	8	Attorney Docket Number	IMMR-050/04US

	Getow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WAI-11-00, pp. 332-337	
	Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 55-61, ASME 1992	
	Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 63-70, ASME 1992	
	Kontarinos et al., "Display of High-Frequency Tactile Information to Teleoperators," <i>Telemanipulator Technology and Space Telerobotics</i> , Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993	
	Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," <i>Cooperative Intelligent Robotics in Space</i> , Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990	
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," <i>Ph.D. Dissertation</i> , Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90	
	Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," <i>Science</i> , Vol. 208, No. 4450, pp. 1327-1335, 1980	
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," <i>Proceedings Of Fourth CISM-IFTOMM</i> , Sep. 8-12, 1981	
	McAfee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," <i>JPL</i> 1988, JPL D-5172	
	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," <i>Ph.D. Dissertation</i> , MIT, June 1995, archived 7/6/95	
	Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," <i>Intervention/ROV '91 Conference & Exposition</i> , Hollywood, Florida, May 21-23, 1991	
	Shlomo, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration</i> , Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992	
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
	Terry et al., "Tactile Feedback In A Computer Mouse," <i>Proceedings of Fourteenth Annual Northeast Bioengineering Conference</i> , University of New Hampshire, March 10-11, 1988	
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," <i>Proceedings of the 1992 IEEE International Conference on Robotics and Automation</i> , Nice, France, May 1992	
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993	
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," <i>Journal of The Acoustical Society of America</i> , Vol. 82, No. 4, October 1987	
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," <i>International Computer Technology Conference, The American Society of Mechanical Engineers</i> , San Francisco, CA, August 12-15, 1980	
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," <i>SOAR '89 Workshop</i> , JSC, Houston, TX, July 25-27, 1989	
	Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995	
	Marcus, "Touch Feedback in Surgery," <i>Proceedings of Virtual Reality and Medicine The Cutting Edge</i> , Sep. 8-11, 1994	
	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987	
	SCANNELL, "Taking a Joystick Ride," <i>Computer Currents</i> , Boston Edition, Vol. 9, No. 11, November 1994.	

Examiner Signature	/Jeffery Briet/	Date Considered	08/03/2008
---------------------------	-----------------	------------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

Please type a plus sign (+) inside this box → ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				Application Number	
				Filing Date	February 19, 2004
				First Named Inventor	Louis B. ROSENBERG
				Group Art Unit	
				Examiner Name	
Sheet	7	of	8	Attorney Docket Number	IMMR-050/04US

repeat
1 of 2

from	3 of 3	<p>"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2003 (2 pages).</p> <p>"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).</p> <p>Snow, E., et al., "Compact Force Reflecting Hand Controller," NASA Tech Brief Vol. 15, No. 4, Item 153, April 1991, pp. 1, 1-3, 1a-15a.</p> <p>Howe, R. et al., "Task Performance with a Dextrous Teleoperated Hand System," Proceedings of SPIE, Vol. 1833, Nov. 1992.</p> <p>Buttolo, et al., "Hard Disk Actuators for Mini Teleoperation," Proc. SPIE, Telemanipulator and Telepresence Technologies Symp., Oct. 1994, pp. 1-8.</p> <p>Kilpatrick, P., "The Use of a Kinesthetic Supplement in an Interactive Graphics System," Univ. of N. Carolina, 1976, pp. 1-175.</p> <p>Buttolo et al., "Pen Based Force Display for Precision Manipulation in Virtual Environments," IEEE March 1995, pp. 217-224.</p> <p>Ellis, R.E. et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface" ASME December 3, 1993, DSC-Vol. 49, pp. 55-64.</p> <p>Adelstein Bernard D. et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," Massachusetts Institute of Technology 1992, pp. 108-112.</p> <p>Colgate, J. et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," Sept. 22, 1993.</p> <p>Burdea, G., et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," May 1993, pp. 25-44.</p> <p>Rosenberg, Louis B., "The Use of Virtual Fixtures to Enhance Operator Performance in Time Delayed Teleoperation, Armstrong Laboratory, March 1993, pp. 1-45.</p> <p>Rosenberg, Louis B., "Perceptual Design of a Virtual Rigid Surface Contact," Center for Design Research Stanford University, Air Force Material Command, April 1993, pp. 1-41.</p> <p>Burdea, Grigore et al., "Dextrous Telerobotics with Force Feedback-An Overview," Robotica 1991, Vol. 9.</p> <p>Adelstein, Bernard D. et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research," Dept. of Mech. Eng., MIT, 1992, pp. 1-24.</p> <p>Hannaford, B., et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Transactions on Systems, Man, and Cybernetics, 1991.</p> <p>Minsky, et al., "Feeling and Seeing: Issues in Force Display," Department of Computer Science, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, 1990 ACM.</p> <p>Batter, et al., "Grape-1: A Computer Display to the Sense of Feel," University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA</p> <p>Gotow, J.K., et al., "Perception of Mechanical Properties at the Man-Machine Interface," IEEE 1987, pp. 688-689.</p> <p>Atkinson, William D. et al., "Computing with Feeling," Comput. & Graphics, Vol. 2, 1977, pp. 97-103.</p> <p>Tavkhelidze, et al., "Kinematic Analysis of Five-Link Spherical Mechanisms," Mechanism and Machine Theory, Vol. 9, 1974, pp. 181-190.</p> <p>Schmult, Brian et al., "Application Areas for a Force-Feedback Joystick," ASME 1993, DSC-Vol. 49, pp. 47-54.</p>
------	--------	--

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Please type a plus sign (+) inside this box → +

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	
				Filing Date	February 19, 2004
				First Named Inventor	Louis B. ROSENBERG
				Group Art Unit	
				Examiner Name	
Sheet	8	of	8	Attorney Docket Number	IMMR-050/04US

repeat from

5 of 8

Xed through

considered on

9/24/2007

		Russo, "The Design and Implementation of a Three Degree-of-Freedom Force Submitted Output Joystick", Submitted to the Department of Mechanical Engineering on May 11, 1990.	
		Kelley, A.J. et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Engineering, Univ. of British Columbia, 1993, pp. 4-27.	
		Brooks, F. et al., "Project GROPE-- Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, 1990, pp. 177-185.	
		Millman, P. et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum with a Specified Force/Torque Workspace," IEEE CH2969-4, 1991, pp. 1488-1492.	
		Ramstein, et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI 1994.	
		Ramstein, C., "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ASSETS '96, 2nd Annual ACM Conf. on Assistive Technologies, 1996, pp. 37-44.	
		Payette, J. et al., "Evaluation of a Force Feedback (Haptic) Computer Pointing Device in Zero Gravity", Proceedings of the ASME Dynamics Systems and Control Division, ASME 10/17/1996, pp. 547-553.	
		Iwata, H., "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, 1990, pp. 165-170.	
		Hirota, Koji et al., "Development of Surface Display," IEEE 0-7803-1363-1, 1993, pp. 256-262.	
		Bestrom, M. et al., "Design of An Interactive Lumbar Puncture Simulator with Tactile Feedback," IEEE 0-7803-1363-1, 1993, pp. 280-286.	

Examiner Signature	/Jeffery Brier/	Date Considered	08/03/2008
---------------------------	-----------------	------------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

195918 v1/RE
4766011.DOC

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

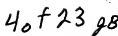


1 of 23

copy

Form PTO 1449 (Rev. 2-3-99) U.S. Department of Commerce Patent and Trademark Office				Atty. Docket No. IMMR-0013D (034701-007)		Serial No. 10/780,852	
Information Disclosure Statement by Applicant				Applicant: Louis B. Rosenberg et al.			
(Use several sheets if necessary)				Filed: 02/19/2004		Group: 2628	
U.S. Patent Documents							
Init.	Document No.	Date	Name	Class	Subclass	Filing Date	
/JB/	4,689,449	08/25/1987	Rosen				
/JB/	4,758,692	07/19/1988	Roeser et al.				
/JB/	4,857,881	08/15/1989	Hayes				
/JB/	4,994,669	02/19/1991	Stern				
/JB/	5,223,776	06/29/1993	Radke et al.				
/JB/	5,228,356	07/20/1993	Chuang				
/JB/	5,436,640	07/25/1995	Reeves				
/JB/	5,589,626	12/31/1996	Armstrong				
/JB/	5,589,854	12/31/1996	Tsai				
/JB/	5,629,594	05/13/1997	Jacobus et al.				
/JB/	5,724,068	03/03/1998	Sanchez et al.				
/JB/	5,731,804	3/24/1998	Rosenberg				
/JB/	5,739,811	04/14/1998	Rosenberg et al.				
/JB/	5,742,278	04/21/1998	Chen et al.				
/JB/	5,754,023	05/19/1998	Roston et al.				
/JB/	5,805,140	09/08/1998	Rosenberg et al.				
/JB/	6,201,533	3/13/2001	Rosenberg et al.				
/JB/	6,697,048	2/24/2004	Rosenberg et al.				
Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)							
/JB/	Millman, Paul A. et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum with a Specified Force/Torque Workspace," Depart. Of Mechanical Engineering, 1991, pp. 1488-1493.						
/JB/	Ouhyoung, Ming et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," IEEE Transactions on Consumer Electronics, Vol. 41, No. 3, August 1995, pp. 787-194.						
/JB/	Russo, Massimo Andrea, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," Dept. of Mechanical Engineering, MIT May 1990, 131 pages.						
/JB/	Schmull, Brian et al., "Application Areas For A Force-Feedback Joystick," DSC-Vol. 49, Advanced in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 47-54.						
/JB/	Tadros, Alfred Heikal, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," Dept. of Mechanical Engineering, MIT February 1990, pp. 2-88.						
/JB/	Yamakita, M. et al., "Tele Virtual Reality of Dynamic Mechanical Model," Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems, July 7-10, 1992, pp. 1103-1110.						
Examiner /Jeffery Brier/				Date Considered 09/24/2007			
Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include a copy of this form with the next communication to applicant.							

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/





5 of 23 JB
(1 of 2)

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 3

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

U.S. PATENT DOCUMENTS

Examiner	Cite No.	Document Number Number Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JB/		6,422,941	7/23/2002	Thomer et al.	
/JB/		6,180,469	12/12/2000	Perry et al.	
/JB/		6,111,577	8/28/2000	Zilles et al.	
/JB/		5,690,582	11/25/1997	Ulrich et al.	
/JB/		5,575,761	11/19/1996	Hallanpour	
/JB/		5,437,607	8/1/1995	Taylor	
/JB/		5,436,622	7/25/1995	Gutman et al.	
/JB/		5,283,970	2/8/1994	Alger	
/JB/		5,166,695	2/16/1993	Mendese et al.	
/JB/		5,175,459	12/29/1992	Daniel et al.	
/JB/		5,165,897	11/24/1992	Johnson	
/JB/		5,022,384	6/11/1991	Freets	
/JB/		4,885,965	12/5/1989	Embach	
/JB/		4,484,191	11/20/1984	Vavra	
/JB/		4,484,117	8/7/1984	Foerst	
/JB/		4,333,070	6/1/1982	Barnes	
/JB/		4,282,549	4/21/1981	Schweilenbach	
/JB/		4,127,752	11/28/1978	Lowthorp	
/JB/		2,872,140	2/14/1961	Hirsch	

Examiner Initials*	Cite No.	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ³	Number ⁴	Kind Code ⁵ (if known)			
		JP	H2-185278		7/19/1990	Taito Corporation	
		JP	H4-8361		1/13/1993	Epoch Game and Key- Planning Co.	
		JP	H7-24443		1/27/1995	Step Corporation	
		JP	H5-192449		8/3/1993	Taito Corporation	

Examiner Signature	/Jeffery Brier/	Date Considered	09/24/2007
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

6 of 23 JB
(1 of 2)

PTO/SB/05A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1996, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet **2** of **3**

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

OTHER PRIOR ART — NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. 1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		PATRICK, "Design, Construction, and Testing of a Fingertp Tactile Display for Interaction with Virtual and Remote Environments," <i>Master of Science Thesis</i> , MIT, Aug. 1990, archived Nov. 8, 1990.
		CALDER, "Design of A Force-Feedback Touch-Introducing Actuator For a Teleoperator Robot Control," <i>Bachelor of Science Thesis</i> , MIT, May 1983, archived June 23, 1983.
		WIKER, "Teletouch Display Development: Phase 1 Report," <i>Technical Report 1230</i> , Naval Ocean Systems Center, San Diego, July 1988.
		BLISS, "Optical-to-Tactile Image Conversion for the Blind," <i>IEEE Transactions on Man-Machine Systems</i> , Vol. MMS-11, No. 1, March 1970.
		JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," <i>Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-90-039</i> , August, 1990.
		KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," <i>PRESENCE</i> , 4(4):387-402, Harvard Univ., 1995.
		AUKSTAKALNIS et al., "Silicon Mirages: The Art and Science of Virtual Reality," ISBN 0-936151-82-7, pp. 129-180, 1992.
		EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," <i>DSC-Vol. 55-1, Dynamic Systems and Control</i> Volume 1, ASME 1994.
		GOBEL et al., "Tactile Feedback Applied to Computer Mice," <i>International Journal of Human-Computer Interaction</i> , Vol. 7, No. 1, pp. 1-24, 1995.
		PIMENTEL et al., "Virtual Reality: through the new looking glass," 2 nd Edition; McGraw-Hill, ISBN 0-07-050187-X, pp. 41-202, 1994.
		"Cyberman Technical Specification," <i>Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide</i> , 4/9/1994.
		OHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," <i>Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95</i> , Seoul, Korea, 21-24 August 1995.
		KACZMAREK et al., "Tactile Displays," <i>Virtual Environment Technologies</i> , Chap. 9, pp. 349-414.
		LAKE, "Cyberman from Logitech," at http://www.liblio.org/GameBytes/Issue21/greivews/cyberman.html , 1994.

Examiner Signature	Date Considered
--------------------	-----------------

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. JB/

7 of 23 98
(1 of 2)

PTO/SB08A (10-01)

Approved for use through 10/31/2002. OMB 0851-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet **3** of **3**

Complete If Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. Rosenberg
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR-050/04US

OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No. 1	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		*Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part no. C-25502, Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages).
		*Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part no. C-25502, Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).
		SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994.
/JB/		YAMAKITA et al., "Tele-Virtual Reality of Dynamic Mechanical Model," Proceedings of the 1992 IEEEERSJ International Conference on Intelligent Robots and Systems, Raleigh, NC, July 7-10, 1992.
		NULL, "Man-Machine Tactile," SID Journal, July/August 1972 Issue.
		ROSENBERG, "Visual-Pictorial Perceptual Overlays Enhance Operator Performance in Telepresence Tasks," Ph.D. Dissertation, Stanford University, June 1994.

Examiner Signature	/Jeffery Brier/	Date Considered	09/24/2007
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/



8 of 23 JB
(2 of 2)

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 1 of 8

Complete If Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

U.S. PATENT DOCUMENTS

Examiner	Cite No. ¹	Document Number Number Kind Code ² (# known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JB/		6,057,828	05-2000	Rosenberg et al.	
/JB/		6,050,716	04-2000	Schena et al.	
/JB/		6,046,727	04-2000	Rosenberg et al.	
/JB/		6,037,927	03-2000	Rosenberg	
/JB/		5,944,151	08-1999	Jakobs et al.	
/JB/		5,889,672	03-1999	Schuler et al.	
/JB/		5,880,714	03-1999	Rosenberg et al.	
/JB/		5,823,876	10-1998	Unbehnd	
/JB/		5,781,172	07-1998	Engel et al.	
/JB/		5,789,640	07-1998	Jacobus et al.	
/JB/		5,739,811	04-1998	Rosenberg et al.	
/JB/		5,714,978	02-1998	Yamanaka et al.	
/JB/		5,704,791	01-1998	Gillo	
/JB/		5,701,140	12-1997	Rosenberg et al.	
/JB/		5,691,896	11-1997	Rosenberg et al.	
/JB/		5,656,901	08-1997	Kurita	
/JB/		5,634,794	06-1997	Hildreth et al.	
/JB/		5,623,582	04-1997	Rosenberg	
/JB/		5,591,082	01-1997	Jensen et al.	
/JB/		5,542,672	08-1996	Meredith	
/JB/		5,532,585	07-1996	Oudet et al.	
/JB/		5,512,919	04-1996	Araki	
/JB/		5,473,235	12-1995	Lance et al.	
/JB/		5,467,763	11-1995	McMahon et al.	
/JB/		5,459,382	10-1995	Jacobus et al.	
/JB/		5,451,924	09-1995	Massimino et al.	
/JB/		5,444,694	08-1995	Massimino et al.	
/JB/		5,445,168	08-1995	Taylor	
/JB/		5,436,542	07-1995	Petelin et al.	
/JB/		5,426,748	06-1995	Davidson et al.	
/JB/		5,417,696	05-1995	Kashuba et al.	
/JB/		5,412,880	05-1995	Raab	
/JB/		5,402,582	04-1995	Raab	
/JB/		5,397,323	03-1995	Taylor et al.	
/JB/		5,396,266	03-1995	Brimhall	
/JB/		5,389,865	02-1995	Jacobus et al.	

Examiner Signature	/Jeffery Brier/	Date Considered	09/24/2007
-----------------------	-----------------	--------------------	------------

¹ EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

² Applicant's unique citation designation number (optional). ³ Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ⁴ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁵ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁶ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁷ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

9 of 23 PB
(2 of 2)

PTO/SB/08A (10-01)
Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it carries a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2

of

8

Complete If Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

U.S. PATENT DOCUMENTS					
Examiner	Cite No. ¹	Document Number Number Kind Code ² (If known)	Publication Date MM-DD-YYYY	Name of Patented or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JB/		5,384,460	01-1995	Tseng	
/JB/		5,381,080	01-1995	Schnell et al.	
/JB/		5,351,692	10-1994	Dow et al.	
/JB/		5,286,203	02-1994	Fuller et al.	
/JB/		5,262,777	11-1993	Low et al.	
/JB/		5,259,884	11-1993	Sampson	
/JB/		5,259,120	11-1993	Chapman et al.	
/JB/		5,251,156	10-1993	Heier et al.	
/JB/		5,251,127	10-1993	Rasab	
/JB/		5,243,266	09-1993	Kasagami et al.	
/JB/		5,235,868	08-1993	Culver	
/JB/		5,230,623	07-1993	Guthrie et al.	
/JB/		5,220,260	08-1993	Schuler	
/JB/		5,209,131	05-1993	Baxter	
/JB/		5,204,824	04-1993	Fujimaki	
/JB/		5,187,003	03-1993	Moncrief et al.	
/JB/		5,189,806	03-1993	McMurtry et al.	
/JB/		5,189,355	02-1993	Larkins et al.	
/JB/		5,187,874	02-1993	Takahashi et al.	
/JB/		5,184,306	02-1993	Erdman et al.	
/JB/		5,181,181	01-1993	Glynn	
/JB/		5,178,012	01-1993	Culp	
/JB/		5,148,377	09-1992	McDonald	
/JB/		5,142,506	08-1992	Edwards	
/JB/		5,139,261	08-1992	Openiano	
/JB/		5,132,672	07-1992	Clark	
/JB/		5,131,844	07-1992	Marinaccio et al.	
/JB/		5,128,671	07-1992	Thomas, Jr.	
/JB/		5,126,948	06-1992	Mitchell et al.	
/JB/		5,118,180	05-1992	Fung et al.	
/JB/		5,107,262	04-1992	Cadoz et al.	
/JB/		5,095,303	03-1992	Clark et al.	
/JB/		5,088,055	02-1992	Oyama	
/JB/		5,088,046	02-1992	McMurtry et al.	
/JB/		5,076,517	12 1991	Ferranti et al.	
Examiner Signature	/Jeffery Brier/		Date Considered	09/24/2007	

¹ EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 809. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

² Applicant's unique citation designation number (optional). ³ Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ⁴ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁵ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁶ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁷ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

10 of 23 9B
(2 of 2)

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet **3**

of **8**

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

U.S. PATENT DOCUMENTS

Examiner	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/JB/		5,072,361	12-1991	Davies et al.	
/JB/		5,050,608	09-1991	Watanabe et al.	
/JB/		5,040,306	08-1991	McMurtry et al.	
/JB/		5,007,085	04-1991	Greamlas et al.	
/JB/		4,983,901	01-1991	Lehmer	
/JB/		4,983,786	01-1991	Stevens et al.	
/JB/		4,962,504	01-1991	Soderberg et al.	
/JB/		4,962,591	10-1990	Zeller et al.	
/JB/		4,961,267	10-1990	Herzog	
/JB/		4,961,138	10-1990	Gomlak	
/JB/		4,945,501	07-1990	Bell et al.	
/JB/		4,945,305	07-1990	Blood	
/JB/		4,942,545	07-1990	Sapia	
/JB/		4,907,973	03-1990	Hon	
/JB/		4,907,970	03-1990	Meenan, Jr.	
/JB/		4,891,889	01-1990	Tomelleri	
/JB/		4,888,877	12-1989	Enderle et al.	
/JB/		4,879,556	11-1989	Dulmel	
/JB/		4,874,996	10-1989	Hollis, Jr.	
/JB/		4,868,549	09-1989	Affinito et al.	
/JB/		4,857,881	08-1989	Hayes	
/JB/		4,849,692	07-1989	Blood	
/JB/		4,839,836	06-1989	LaBiche et al.	
/JB/		4,823,634	04-1989	Culver	
/JB/		4,819,195	04-1989	Bell et al.	
/JB/		4,798,919	01-1989	Messler et al.	
/JB/		4,795,296	01-1989	Jau	
/JB/		4,791,934	12-1988	Brunnett	
/JB/		4,787,051	11-1988	Olson	
/JB/		4,769,763	09-1988	Trieb et al.	
/JB/		4,750,467	06-1988	Zanetti	
/JB/		4,706,294	11-1987	Ouchida	
/JB/		4,703,443	10-1987	Moriyasu	
/JB/		4,688,983	08-1987	Lindborn	
/JB/		4,679,331	07-1987	Koontz	
/JB/		4,677,355	06-1987	Baumann	

Examiner
Signature

/Jeffery Brier/

Date
Considered

09/24/2007

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

11 of 23 PB
(2 of 2)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 4

of

8

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

U.S. PATENT DOCUMENTS

Examiner	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number Kind Code ² (if known)			
/JB/		4,676,002	06-1987	Stocum	
/JB/		4,654,648	03-1987	Herrington et al.	
/JB/		4,653,011	03-1987	Iwano	
/JB/		4,638,798	01-1987	Shelden et al.	
/JB/		4,601,206	07-1988	Watson	
/JB/		4,593,470	08-1988	Davies	
/JB/		4,571,834	02-1988	Fraser et al.	
/JB/		4,560,983	12-1985	Williams	
/JB/		4,550,221	10-1985	Mabush	
/JB/		4,477,973	10-1984	Davies	
/JB/		4,391,282	07-1983	Ando et al.	
/JB/		3,944,798	03-1976	Eaton	
/JB/		3,890,958	06-1975	Fister et al.	
/JB/		3,875,488	04-1975	Crocker et al.	
/JB/		3,531,868	10-1970	Stevenson	
/JB/		2,906,179	09-1959	Bower	

Examiner
Signature

/Jeffery Brier/

Date
Considered

09/24/2007

¹ EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

² Applicant's unique citation designation number (optional). ³ Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ⁴ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁵ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁶ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁷ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

12 of 23 95
(2 of 2)

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(uses as many sheets as necessary)

Sheet **5** of **8**

Complete if Known

Application Number **10/780,852**
Filing Date **February 19, 2004**
First Named Inventor **Louis B. ROSENBERG**
Art Unit **2173**
Examiner Name **Unassigned**
Attorney Docket Number **IMMR050/04US**

Examiner Initials*	Cite No. ¹	Foreign Patent Document			Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Country Code ²	Number ³	Kind Code ⁴ (if known)			
		EP	0085518	A1	08-1983		
		WO	96/16397		05-1996		
		WO	96/09944		12-1996		
		JP	4-34810		02-1992		
		GB	225491		10-1992		
		WO	9502233		01-1995		
		WO	9502801		01-1995		
		WO	9520787		08-1995		
		WO	9520788		08-1995		
		WO	9532459		11-1995		
		WO	9616397		05-1996		
		WO	9622591		07-1996		
		WO	9642078		12-1996		
		WO	9712357		04-1997		

Examiner Signature

Date Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Kind Codes of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. JB/

13 of 23 JB

(2 of 2)

 FTO/S&OLA (10-01)
 Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Password Reduction Act of 1985, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 6 of 8

Complete if Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume, issue number(s), publisher, city and/or country where published.
		Curso Waldo, "Designer's Corner-Useful Technology for Your Idea File Design News," March 7, 1994, pp. 63.
		Alametsky, et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presence, Vol. 2, No. 1, Winter 1994, pp. 73-82.
		Kelley, et al., "On the Development of a Force-Feedback Mouse and Its Integration into a Graphical User Interface," Symp. on Haptic Interfaces for Virtual Environment and Teleoperator Systems, Int'l Mech. Eng. Congress and Exhibition, Nov. 1994.
		Hayward, et al., "Design and Multi-Objective Optimization of a Linkage for a Haptic Interface," excerpt from, Advances in Robot Kinematics and Computational Geometry, 1994 Kluwer Academic Publishers, pp. 359-368.
		Winey III, Calvin Mccoy, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control," MIT, Jun. 1981, pp. 1-79.
/JB/		Tan, Hong Z et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," ASME 1993, DSC-vol. 49, pp. 99-104.
/JB/		Kolotuk, Tetsuo, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," IEEE 1992, Jul. 7-10, 1992, pp. 239-248.
/JB/		Slocum, Alexander H., Precision Machine Design, Prentice Hall, 1992, pp. 661-684. "12-V Voice Coil Motor Driver," SI9961 Jun. 8, 1994, pp. 4-10-4-16.
		Kolotuk, Tetsuo et al., "Environment Modeling for the Interactive Display (EMID) Used in Teleoperator Systems," IEEE, Nov. 3-5, 1991, pp. 99-1004.
		Bejczy, Antal K., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," IEEE 1990, pp. 546-550.
/JB/		Tan, Hong Z., et al., "Human Factors for the Design of Force-Reflecting Haptic Interfaces," Tan, Srinivasan, Eberman, & Chang, ASME WAM 1994, pp. 1-11.
/JB/		Iwata, Hiroo et al, Volume Haptization, IEEE 1993, pp. 16-18.
/JB/		Fischer, Patrick et al., "Specification and Design of Input Devices for Teleoperation," 1990.
		Gardner, Eugene et al., "Predictive Force Feedback," IEEE, May 5, 1993, pp. 25-34.
/JB/		Rosenberg, Louis B., "The Use of Virtual Fixtures as Perceptual Overlays to Enhance Operator Performance in Remote Environments," Air Force Material Command, Sep. 1992, pp. 1-42.
Examiner Signature	Jeffery Brier/	
Date Considered	09/24/2007	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

* Applicant's unique citation designation number (optional). * Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 7 of 8

Complete If Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART — NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
/JB/		Rosenberg, Louis B. et al., "Perceptual Decomposition of Virtual Haptic Surfaces," IEEE, Oct. 1993.
/JB/		Rosenberg, Louis B., "Virtual Fixtures as Tools to Enhance Operator Performance in Telepresence Environments" SPIE Telemanipulator Technology, Mar. 1993.
/JB/		Rosenberg, Louis B., "Virtual Haptic Overlays Enhance Performance in Telepresence Tasks," SPIE 1994.
		Burdia, Gergo et al., "Dextrous Telerobotics with Force Feedback: An Overview," Robotics 1994, vol. 9.
		Yamashita, M. et al., "Teleoperation Reality of Dynamic Mechanical Model," IEEE Jul. 7-10, 1992, pp. 1465-1470.
/JB/		Ouh-young, Ming et al., "Force Display Performs Better than Visual Display in a Simple 6-D Docking Task," IEEE 1989, pp. 1462-1466.
		Kim, Won S. et al., "Graphics Displays for Operator Aid in Telemanipulation," IEEE 1991, pp. 1058-1067.
		Hannaford, Blake et al., "Performance Evaluation of a Six-DOF Generalized Force-Reflecting Teleoperator," IEEE May/Jun. 1991, vol. 21, No. 3, pp. 620-633.
/JB/		Kim, Won S. et al., "A Teleoperation Training Simulator with Visual and Kinesthetic Force Virtual Reality.
/JB/		Burdia, Gergo et al., "A Portable Dextrous Master with Force Feedback," Presence: Teleoperators and Virtual Environments, MIT Press, Jun. 1991.
/JB/		Fisher, S.S. et al., "Virtual Environment Display System," ACM Interactive 3D Graphics, Oct. 1988.
		"The Personal Digitizer.TM," Immersion Human Interface Corporation 1994.
		"High Performance Master or Immersion Probe," Immersion Probe-MO.TM., Immersion Human Interface Corporation.
		3D Human Interface Tool, Immersion Probe.TM., Immersion Human Interface Corporation 1994.
/JB/		Meyer, Kenneth et al., "A Survey of Position Trackers," The Massachusetts Institute of Technology 1992, Presence, vol. 1, No. 2.

Examiner Signature

/Jeffery Brier/

Date Considered

09/24/2007

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

* Applicant's unique citation designation number (optional). * Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

15 of 23 PB
(2 of 2)

PTO/SB/05A (10-01)

Approved for use through 10/31/2002. OMB 0651-0031
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet **8** of **8**

Complete If Known

Application Number	10/780,852
Filing Date	February 19, 2004
First Named Inventor	Louis B. ROSENBERG
Art Unit	2173
Examiner Name	Unassigned
Attorney Docket Number	IMMR050/04US

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials *	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.
		*Useful Technology for Your Idea File," Design News, Mar. 7, 1994, pp. 63.
		Smith, Geoffrey, "Call It Palpable Progress," Business Week, Oct. 9, 1995, pp. 93, 96.
		Hemdon, J.N. et al., "The State-of-the-Art Modal M-E Maintenance System," Proceedings of the 1984 National Topical Meeting on Robotics and Remote Handling in Hostile Environments, American Nuclear Society, pp. 59-65.
		*Proceedings of the IFIP Congress 65, "International Federation for Information Processing, Information Processing 1965, vol. 3, New York, May 24-29, 1965, pp. 506.
		Noll, A. Michael, "Man-Machine Tactile Communication Dissertation," Polytechnic Institute of Brooklyn, Jun. 1971, pp. 1-8.
/JB/		Ouh-Young, Ming et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE 1988, pp. 1824-1829.
		Wiker, Steven F. et al., "Development of Tactile Mice for Blind Access to Computers: Importance of Stimulation Locus, Object Size, and Vibrotactile Display Resolution," Proceedings of the Human Factors Society 36th Annual Meeting 1991, pp. 708-712.
		Krueger, Myron W., Artificial Reality 1988, pp. 54-75.
		*Foot-Operated Mouse," IBM Technical Disclosure Bulletin, Apr. 1988, vol. 31, No. 11.

Examiner Signature	/Jeffery Brier/	Date Considered	09/24/2007
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Applicant's unique citation designation number (optional). ² Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Please type a plus sign (+) inside this box →

+

16 of 23 98

PTO/SB/08A (08-00)

Substitute for form 1449/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>		Application Number	
		Filing Date	February 19, 2004
		First Named Inventor	Louis B. ROSENBERG
		Group Art Unit	
		Examiner Name	
Sheet	1	of	8
		Attorney Doctus Number	04MR-050/04US

U.S. PATENT DOCUMENTS					
Examiner Initials ¹	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Number	Kind Code ² (if known)		
/JB/		5,785,630		Bobblet, et al.	07/30/1990
/JB/		5,766,016		Stoeckel et al.	06/16/1990
/JB/		5,547,352		Vonnachd et al.	05/20/1995
/JB/		5,666,213		Nogon et al.	11/13/1995
/JB/		5,334,077		Wherlock	02/02/1994
/JB/		5,305,100		Everett, Jr., et al.	05/03/1994
/JB/		5,299,010		Pierce et al.	04/05/1994
/JB/		5,275,174		Coch	01/03/1994
/JB/		5,271,290		Fischer	12/21/1993
/JB/		5,240,417		Smithson et al.	02/03/1993
/JB/		5,212,473		Lewis	05/10/1993
/JB/		5,070,152		Bond et al.	01/07/1992
/JB/		5,030,009		Sachely	02/06/1991
/JB/		5,035,242		Franklin et al.	07/30/1991
/JB/		5,022,407		March et al.	06/11/1991
/JB/		5,019,761		Kraft	05/20/1991
/JB/		4,934,694		Melintosh	06/19/1990
/JB/		4,930,770		Behar	06/05/1990
/JB/		4,891,764		Melintosh	01/02/1990
/JB/		4,794,393		Sellako	12/27/1988
/JB/		4,713,087		Albon	12/15/1987
/JB/		4,700,656		de Vries et al.	11/24/1987
/JB/		4,599,070		Hindby et al.	07/02/1986
/JB/		4,581,491		Boothroyd	04/06/1986
/JB/		4,513,235		Archum et al.	04/23/1985
/JB/		4,236,325		Hoff et al.	12/02/1980
/JB/		4,169,500		Saltbury, Jr.	07/10/1979
/JB/		3,911,416		Feder	10/07/1975
/JB/		3,903,614		Diamond et al.	09/02/1975
/JB/		3,902,687		Hightower	09/02/1975
/JB/		3,623,060		Kayna	11/23/1971
/JB/		3,517,446		Corlyon et al.	06/30/1970
/JB/		3,497,660		Hirsch	02/23/1970

Examiner Signature	/Jeffery Brier/	Date Considered	09/25/2007
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number.

² See attached Kinds of U.S. Patent Documents.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

17 of 23 98

Please type a plus sign (+) inside this box → ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)				<i>Complete if Known</i>	
				Application Number	
				Filing Date February 19, 2004	
				First Named Inventor Louis B. ROSENBERG	
				Group Art Unit	
				Examiner Name	
Sheet	2	of	8	Attorney Docket Number DMMR-050/04US	

/JB/		3,320,121		Cutler	11/30/1965
/JB/		3,157,853		Hirsch	11/17/1964
/JB/		4,994,669		Stern	02/1991
/JB/		6,201,533		Rosenberg	03/2000
/JB/		6,004,134		Marcus et al.	12/1999
/JB/		5,831,596		Marshall et al.	11/1998
/JB/		5,806,146		Rosenberg et al.	06/1998
/JB/		5,790,108		Saleudcan et al.	08/1998
/JB/		5,731,804		Rosenberg	03/1998
/JB/		5,228,356		Chang	07/1993
/JB/		5,182,557		Lang	01/1993
/JB/		4,794,388		Matthews	12/1988
/JB/		4,758,692		Roeser et al.	07/1988
/JB/		3,832,895		Strandh	09/1974
/JB/		3,490,059		Paulsen et al.	01/13/1970
/JB/		3,795,150		Eckhardt	03/05/1974
/JB/		3,919,691		Noll	11/11/1975
/JB/		4,148,014		Burson	04/03/1979
/JB/		4,216,467		Colston	08/05/1980
/JB/		4,398,889		Lam et al.	08/16/1983
/JB/		4,414,984		Zarudiansky	11/15/1983
/JB/		4,436,188		Jones	03/13/1984
/JB/		4,448,083		Hayashi	05/15/1984
/JB/		4,477,043		Repperger	10/16/1984
/JB/		4,489,304		Hayes	12/18/1984
/JB/		4,538,035		Pool	08/27/1985
/JB/		4,550,617		Fragnier et al.	11/05/1985
/JB/		4,603,284		Ferdoy	07/29/1986
/JB/		4,604,016		Joyce	08/05/1986
/JB/		4,632,341		Repperger et al.	12/30/1986
/JB/		4,689,449		Rosen	08/25/1987
/JB/		4,704,909		Grahn et al.	11/10/1987
/JB/		4,712,101		Culver	12/08/1987
/JB/		4,712,971		Fyler	12/15/1987
/JB/		4,775,289		Kazerooni	10/04/1988
/JB/		4,800,721		Cemensha et al.	01/31/1989
/JB/		4,803,413		Kendig et al.	02/07/1989
/JB/		4,811,608		Hilton	03/14/1989
/JB/		4,861,269		Meenen, Jr.	08/29/1989
/JB/		4,874,998		Hollis Jr.	10/17/1989
/JB/		4,878,374		Nelson	11/07/1989

Examiner Signature	/Jeffery Brier/	Date Considered	09/25/2007
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

18 of 23 PB

Please type a plus sign (+) inside this box →

+

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		<i>Complete if Known</i>	
		Application Number	
		Filing Date	February 19, 2004
		First Named Inventor	Louis B. ROSENBERG
		Group Art Unit	
Examiner Name		Attorney Docket Number	04MR-050/04US

/JB/	4,879,556		Duimed	11/07/1992
/JB/	4,896,556		Culver	01/30/1993
/JB/	4,949,119		Monerief et al.	02/10/1993
/JB/	4,962,440		DelVicio et al.	10/29/1993
/JB/	5,007,300		Sivo	04/16/1991
/JB/	5,044,956		Bekenshy et al.	09/03/1991
/JB/	5,103,404		McIntosh	04/07/1992
/JB/	5,107,080		Rosen	04/21/1992
/JB/	5,107,719		Kotin	04/22/1992
/JB/	5,116,091		Monerief et al.	05/26/1992
/JB/	5,142,931		Mianchom	09/01/1992
/JB/	5,143,505		Bardoo et al.	09/01/1992
/JB/	5,146,566		Hollis, Jr. et al.	09/01/1992
/JB/	5,182,557		Long	01/26/1993
/JB/	5,184,318		Kromer	02/02/1993
/JB/	5,185,561		Good et al.	02/02/1993
/JB/	5,186,629		Rosen	02/16/1993
/JB/	5,193,963		McAfee et al.	03/16/1993
/JB/	5,223,776		Rodhe et al.	06/29/1993
/JB/	5,220,356		Chenon	07/20/1993
/JB/	5,264,760		Gregory et al.	11/23/1993
/JB/	5,275,566		Monerief	01/04/1994
/JB/	5,277,201		Carlson et al.	01/11/1994
/JB/	5,296,046		LeRoy	03/22/1994
/JB/	5,296,071		Poley	03/22/1994
/JB/	5,351,412		Perabotto et al.	10/04/1994
/JB/	5,354,163		Bardoo et al.	10/11/1994
/JB/	5,358,140		Anderson	10/11/1994
/JB/	5,379,663		Kuro	01/10/1995
/JB/	5,396,266		Brimhall	03/07/1995
/JB/	5,396,267		Becton	03/07/1995
/JB/	5,493,132		Kotocles et al.	04/11/1995
/JB/	5,410,337		Schuler	05/09/1995
/JB/	5,429,149		Bardoo et al.	07/05/1995
/JB/	5,436,649		Roscoe	07/25/1995
/JB/	5,452,615		Hilton	09/26/1995
/JB/	5,513,109		Parlier et al.	04/08/1996
/JB/	5,565,620		Thornier et al.	10/15/1996
/JB/	5,576,727		Rosenberg et al.	11/19/1996
/JB/	5,577,901		Jervelt	11/26/1996
/JB/	5,587,937		Mossie et al.	12/20/1996
/JB/	5,589,820		Armstrong	12/31/1996

Examiner Signature	/Jeffery Brier/	Date Considered	09/25/2007
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

Please type a plus sign (+) inside this box ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	
		Filing Date	February 19, 2004
		First Named Inventor	Louis B. ROSENBERG
		Group Art Unit	
		Examiner Name	
Sheet	4	of	8
		Attorney Docket Number	IMMR-050/04US

/JB/		5,589,854		Tsal	12/31/1996
/JB/		5,591,924		Hilton	01/07/1997
/JB/		5,629,594		Jacobus et al.	05/13/1997
/JB/		5,642,469		Hannaford et al.	06/24/1997
/JB/		5,643,087		Marcus et al.	07/01/1997
/JB/		5,666,138		Culver	09/09/1997
/JB/		5,666,473		Wallace	09/09/1997
/JB/		5,694,153		Aoyagi et al.	12/02/1997
/JB/		5,709,219		Chen et al.	01/28/1998
/JB/		5,721,566		Rosenberg et al.	02/24/1998
/JB/		5,724,068		Sanchez et al.	03/03/1998
/JB/		5,731,804		Rosenberg	03/24/1998
/JB/		5,734,373		Rosenberg et al.	03/31/1998
/JB/		5,742,278		Chen et al.	04/21/1998
/JB/		5,754,023		Roston et al.	05/19/1998
/JB/		5,755,577		Gillo	05/26/1998
/JB/		5,767,839		Rosenberg	06/16/1998
/JB/		5,784,052		Keyson	07/21/1998
/JB/		5,790,108		Salcedean et al.	08/04/1998
/JB/		5,805,140		Rosenberg et al.	09/08/1998
/JB/		5,816,105		Adelstein	10/06/1998
/JB/		5,821,920		Rosenberg et al.	10/13/1998
/JB/		5,821,921		Osborn et al.	10/13/1998
/JB/		5,828,363		Yaniger et al.	10/27/1998
/JB/		5,847,528		Hui et al.	12/08/1998
/JB/		5,889,670		Schuler et al.	03/30/1999
/JB/		5,914,705		Johnson et al.	06/22/1999
/JB/		5,979,892		Smith	11/09/1999
/JB/		5,984,785		Takeda et al.	11/16/1999
/JB/		6,004,134		Marcus et al.	12/21/1999
/JB/		6,028,593		Rosenberg et al.	02/23/2000
/JB/		6,067,077		Martin et al.	05/23/2000
/JB/		6,104,382		Martin et al.	08/15/2000
/JB/		6,275,213		Tremblay et al.	08/14/2001

Examiner Signature	/Jeffery Brier/	Date Considered	09/25/2007
--------------------	-----------------	-----------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/

20 of 23 JB

Please type a plus sign (+) inside this box ☐

PTO/SB/08A (06-00)

Substitute for form 1449A/PTO		Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Application Number	
		Filing Date	February 19, 2004
		First Named Inventor	Louis B. ROSENBERG
		Group Art Unit	
		Examiner Name	
Sheet	5	of	8
		Attorney Docket Number	IMMR-050040US

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
		Office ¹	Number ²	Kind Code ³ (if known)		
		EP	0 349 086	A1	Stork Kwant B.V.	01/03/1990
		JP	H4-8381		Taito Corporation	01/13/1992
		JP	H2-185278		Taito Corporation	07/19/1990
		JP	H7-24147		Sega Corporation	01/27/1995
		JP	H5-192449		Taito Corporation	08/03/1993
		JP	4-34610			02/05/1992
		UK	2254911A			10/21/1992
		PCT	WO9502233			01/19/1995
		PCT	WO9528787			08/03/1995
		PCT	WO9528788			08/03/1995
		PCT	WO9532459			11/30/1995

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS						
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date page(s), volume-issue number(s), publisher, city and/or country where published.				T ¹
		Baigrie, "Electric Control Loading - A Low Cost, High Performance Alternative," <i>Proceedings of Interservice/Industry Training Systems Conference</i> , pp. 247-254, November 6-8, 1990				
		Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993				
		Russe, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," <i>MIT Libraries Archives</i> pp. 1-131, May 1990, archived 8/14/90				
		Brooks et al., "Hand Controllers for Teleoperation - A State-of-the-Art Technology Survey and Evaluation," <i>JPL Publication 85-11</i> , NASA-CR-172890; N85-28559, pp. 1-84, 03/1/1985				
		Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); <i>Experimental Brain Research</i> , Vol. 79, No. 1, pp. 150-156, 1990				
		Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," 1993 <i>IEEE International Conference on Robotics and Automation</i> , pp. 25-40, 05/02/1993				
		Snow et al., "Model X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989				
		Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990				
		Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," <i>MIT Archive</i> , pp. 1-88, February 1990, archived 8/13/90				
		Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993				
		Adelman et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," <i>DSC-Vol. 42, Advances in Robotics</i> , pp. 1-12, 1992				

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

² For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

³ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

⁴ Applicant to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. JB/

21 of 23 98

Please type a plus sign (+) inside this box → ☐

PTO/SB/08A (08-00)

Substitute for form 1449A/PTO			Complete if Known		
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)			Application Number		
			Filing Date	February 19, 2004	
			First Named Inventor	Louis B. ROSENBERG	
			Group Art Unit		
			Examiner Name		
Sheet	6	of	8	Attorney Docket Number	BMMR-050/04US

	Getow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WAI1-11700, pp. 332-337	
	Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 55-61, ASME 1992	
	Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, <i>Advances in Robotics</i> , pp. 63-70, ASME 1992	
	Kontarinos et al., "Display of High-Frequency Tactile Information to Teleoperators," <i>Telemanipulator Technology and Space Telerobotics</i> , Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993	
	Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," <i>Cooperative Intelligent Robotics in Space</i> , Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990	
	Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," Ph.D. Dissertation, Dept. of Mechanical Engineering, MIT, June 1989, archived 3/13/90	
	Bejczy, "Sensor, Controls, and Man-Machine Interface for Advanced Teleoperation," <i>Science</i> , Vol. 208, No. 4450, pp. 1327-1335, 1980	
	Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," <i>Proceedings Of Fourth CISM-IFTOMM</i> , Sep. 8-12, 1981	
	McAfee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," JPL 1988, JPL D-5172	
	Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," Ph.D. Dissertation, MIT, June 1995, archived 7/6/95	
	Jacobsen et al., "High Performance, Dextrous Telemanipulator With Force Reflection," <i>Intervention/ROV '91 Conference & Exposition</i> , Hollywood, Florida, May 21-23, 1991	
	Shirogaa, "Finger Force and Touch Feedback Issues in Dextrous Telemanipulation," <i>Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration</i> , Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992	
	IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
	Terry et al., "Tactile Feedback In A Computer Mouse," <i>Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire</i> , March 10-11, 1988	
	Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," <i>Proceedings of the 1992 IEEE International Conference on Robotics and Automation</i> , Nice, France, May 1992	
	Eberhardt et al., "OMAR - A Haptic display for speech perception by deaf and deaf-blind individuals," <i>IEEE Virtual Reality Annual International Symposium</i> , Seattle, WA, Sep. 18-22, 1993	
	Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contractor area," <i>Journal of The Acoustical Society of America</i> , Vol. 82, No. 4, October 1987	
	Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," <i>International Computer Technology Conference, The American Society of Mechanical Engineers</i> , San Francisco, CA, August 12-15, 1980	
	Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," <i>SOAR '89 Workshop, JSC</i> , Houston, TX, July 25-27, 1989	
	Oshyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," <i>IEEE Transactions on Consumer Electronics</i> , Vol. 41, No. 3, August 1995	
	Marcus, "Touch Feedback in Surgery," <i>Proceedings of Virtual Reality and Medicine The Cutting Edge</i> , Sep. 8-11, 1994	
	Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987	
	SCANNELL, "Taking a Joystick Ride," <i>Computer Currents</i> , Boston Edition, Vol. 9, No. 11, November 1994.	

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

22 of 25 98

Please type a plus sign (+) inside this box →



PTO/SB/08A (02-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (use as many sheets as necessary)		Complete if Known Application Number Filing Date February 19, 2000 First Named Inventor Louis B. ROSENBERG Group Art Unit Examiner Name Attorney Doctat Number IMMR-050/04US	
Sheet	7	of	8

	"Complement Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instruments Corporation, Revised 28 January 2002 (3 pages).
	"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instruments Corporation, Revised 15 July 1980 (23 pages).
	Snow, E., et al., "Compact Force Reflecting Hand Controller," NASA Tech Brief Vol. 15, No. 4, Item 153, April 1991, pp. 1-3, 1a-15a.
	Hewes, R. et al., "Task Performance with a Dextrous Teleoperated Hand System," Proceedings of SPIE, Vol. 1833, Nov. 1992.
	Burdette, et al., "Hard Disk Actuators for Mini Teleoperation," Proc. SPIE, Telemanipulator and Telepresence Technologies Symp., Oct. 1994, pp. 1-8.
	Kilpatrick, P., "The Use of a Kinesthetic Supplement in an Interactive Graphics System," Univ. of N. Carolina, 1976, pp. 1-175.
	Burdette et al., "Pen Based Force Display for Precision Manipulation in Virtual Environments," IEEE March 1995, pp. 217-224.
	Dalla, R.E. et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface" ASME December 3, 1993, DSC-Vol. 49, pp. 55-64.
	Adelman Bernard D. et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," Massachusetts Institute of Technology 1992, pp. 108-112.
	Colgate, J. et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," Sept. 22, 1993.
	Burden, G., et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993, pp. 25-30.
	Rosenberg, Louis B., "The Use of Virtual Fixtures to Enhance Operator Performance in Time Delayed Teleoperation, Armstrong Laboratory, March 1993, pp. 1-45.
	Rosenberg, Louis B., "Perceptual Design of a Virtual Rigid Surface Contact," Center for Design Research Stanford University, Air Force Material Command, April 1993, pp. 1-41.
	Burden, Grigore et al., "Dextrous Telerobotics with Force Feedback: An Overview," Robotica 1991, Vol. 9.
	Adelman, Bernard D. et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control Research," Dept. of Mech. Eng., MIT, 1992, pp. 1-24.
	Honanford, B., et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Transactions on Systems, Man, and Cybernetics, 1991.
	Minsky, et al., "Feeling and Seeing: Issues in Force Display," Department of Computer Science, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, 1990 ACM.
	Bottor, et al., "Gropo-I: A Computer Display to the Sense of Feel," University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA
	Getow, J.C., et al., "Perception of Mechanical Properties at the Man-Machine Interface," IEEE 1987, pp. 688-689.
	Athlison, William D. et al., "Computing with Feeling," Comput. & Graphics, Vol. 2, 1977, pp. 97-103.
	Tovshelidze, et al., "Kinematic Analysis of Five-Link Spherical Mechanisms," Mechanism and Machine Theory, Vol. 9, 1974, pp. 81-190.
	Schmitt, Brian et al., "Application Areas for a Force-Feedback Joystick," ASME 1993, DSC-Vol. 49, pp. 47-54.

Examiner Signature	Date Considered
--------------------	-----------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant

23 of 23 ps

Please type a plus sign (+) inside this box ➔



PTO/SB/08A (08-00)

Substitute for form 1449A/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				<i>Complete if Known</i>	
				Application Number	
				Filing Date	
				First Named Inventor	
				Group Art Unit	
				Examiner Name	
Sheet	8	of	8	Attorney Docket Number	
				IMMR-050/04US	

		Russ, "The Design and Implementation of a Three Degree-of-Freedom Force-Reflected Output Joystick", Submitted to the Department of Mechanical Engineering on May 11, 1990.	
/JB/		Kelley, A.J. et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Engineering, Univ. of British Columbia, 1993, pp. 1-27.	
/JB/		Brooks, F. et al., "Project GROPE- Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, 1990, pp. 177-185.	
/JB/		Millman, P. et al., "Design of a Four Degree-of-Freedom Force-Reflecting Manipulandum with a Specified Force/Torque Workspace," IEEE CH2969-4, 1991, pp. 1488-1492.	
/JB/		Ramstein, et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI 1994.	
/JB/		Ramstein, C., "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ASSETS '96, 2 nd Annual ACM Conf. on Assistive Technologies, 1996, pp. 37-44.	
/JB/		Payette, J. et al., "Evaluation of a Force Feedback (Haptic) Computer Pointing Device in Zero Gravity", Proceedings of the ASME Dynamics Systems and Control Division, ASME 10/17/1996, pp. 547-553.	
/JB/		Iwata, H., "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, 1990, pp. 165-170.	
/JB/		Hirota, Koichi et al., "Development of Surface Display," IEEE 0-7803-1363-1, 1993, pp. 256-262.	
/JB/		Bostrom, M. et al., "Design of An Interactive Lumbar Puncture Simulator with Tactile Feedback," IEEE 0-7803-1363-1, 1993, pp. 280-286.	

Examiner Signature	/Jeffery Brier/	Date Considered	09/25/2007
-----------------------	-----------------	--------------------	------------

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

195918 v1/RE
4766011.DOC

¹ Unique citation designation number.

² Applicant is to place a check mark here if English language Translation attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /JB/